PacificHydro

Submission No: 122

29 June 2007

Hon Geoff Prosser MP
Chairman
Standing Committee on Industry and resources
House of Representatives
Parliament House

Via Email - ir.reps@aph.gov.au

Dear Chairman

Re: Inquiry into the development of the non-fossil fuel energy industry in Australia: Case study into selected renewable energy sectors

Please find attached Pacific Hydro's submission to the above inquiry.

If you have any queries in relation to our submission, please contact me on the above phone number.

Yours sincerely

Andrew Richards
Executive Manager, Government & Corporate Affairs

ATTACHMENT

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29 June 2007

Renewable Energy in Australia
Developing Australia's non-fossil fuel energy industry
Prepared for the Standing Committee on Industry and Resources

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Introduction

Pacific Hydro welcomes the opportunity to provide a submission to the House of Representatives Standing Committee on Industry and Resources.

As a company with extensive experience in developing zero-emission, renewable energy projects in Australia, Chile, Fiji, The Philippines, the US, Canada, and Brazil ,and in the development and deployment of emerging green technologies, Pacific Hydro remains concerned that Australia is not taking sufficient steps to develop the non-fossil fuel (clean energy) industry.

As a genuinely global company, Pacific Hydro is not wedded to any particular technology or jurisdiction – only a commitment to renewable energy. We carry a relatively unbiased position on the state of play in Australia's non-fossil fuel industry. There is little doubt that Australia remains one of the more difficult investment environments in the world for renewable projects. There are three closely related reasons for this. The first is our abundance of fossil fuel in the form of coal (and uranium), and the second is a regulatory regime which does not provide incentives for investment and the third is the relatively low historic wholesale electricity price. All of these three factors are however undergoing rapid change and revision as we have seen changes in market conditions and changes in the regulatory environments of State Governments.

The revisions of the conventional logic surrounding fossil fuels and electricity prices have their genesis in the most unexpected of sources. The drought that has afflicted South eastern Australia and Southern Queensland in the past 5 years has exposed the risks associated with not diversifying the electricity mix in Australia and over reliance on thermal coal generation. Whilst there has been an awareness around the high greenhouse gas intensity associated with fossil fuel electricity generation, it was ignored that coal-fired electricity generation requires around 20% of Australia's entire water use. Much of this water is high quality drinking water and the water scarcity concurrent with the drought has caused some coal power stations, as well as some large hydro stations to reduce generating capacity. The reduction in supply on to the National Electricity Market (NEM) has caused upward pressure on wholesale electricity prices.

Combined with growth in demand of electricity at around 2% per annum nationwide[1], the drought has highlighted the need for continued increase investment in diversified generating capacity. With ageing infrastructure assets, many generating stations at the latter part of their lifecycle and a deteriorating grid infrastructure, Australia is at a fork in the road on energy investment and the regulatory settings that prevail over the next 3 to 5 years will have a role in shaping what type of electricity sector powers Australia for the next generation or more. Government failure on this issue would be a profound one because of the nature of the sector, investment decisions are locked in for 25 to 35 years. .
We cannot continue as we have in the past and we cannot delay taking action to improve the stationary energy sector. Clean Energy companies are already technologically and financially equipped to deliver the stationary energy sector for the next generation with clean, safe and economical electricity

Resource base and competitive advantage

Australia has an outstanding natural resource base which is a potentially significant competitive advantage for the non-fossil fuel energy sector. Australia possesses world class levels of wind, sunlight and geothermal potential and some of the lowest marginal costs for the technologies. Obviously these resources differ according to the geographical location however given the grid infrastructure of the National Electricity Market; the geographical spread of resources is only a serious problem in the geothermal industry. Just like fossil fuel generators which are situated in areas with large coal deposits in Victoria, Queensland and New South Wales, so some generation capacity will shift to South Australia and Tasmania which have excellent wind resources for instance. Most states with the exception of Tasmania could exploit an excellent solar resource.

Figure 1 Geothermal Map

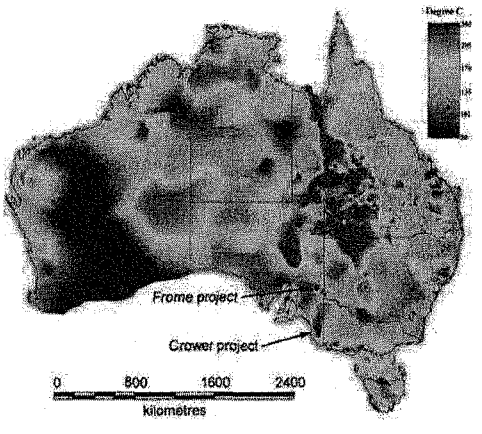
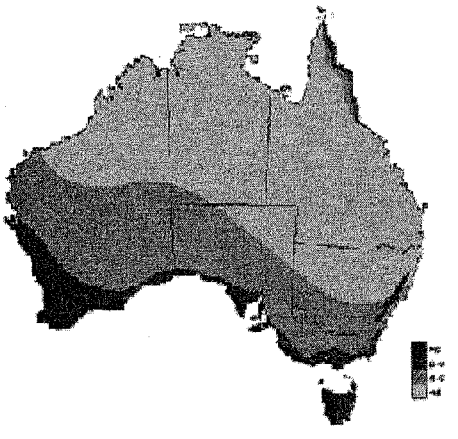


Figure 2 Wind Map



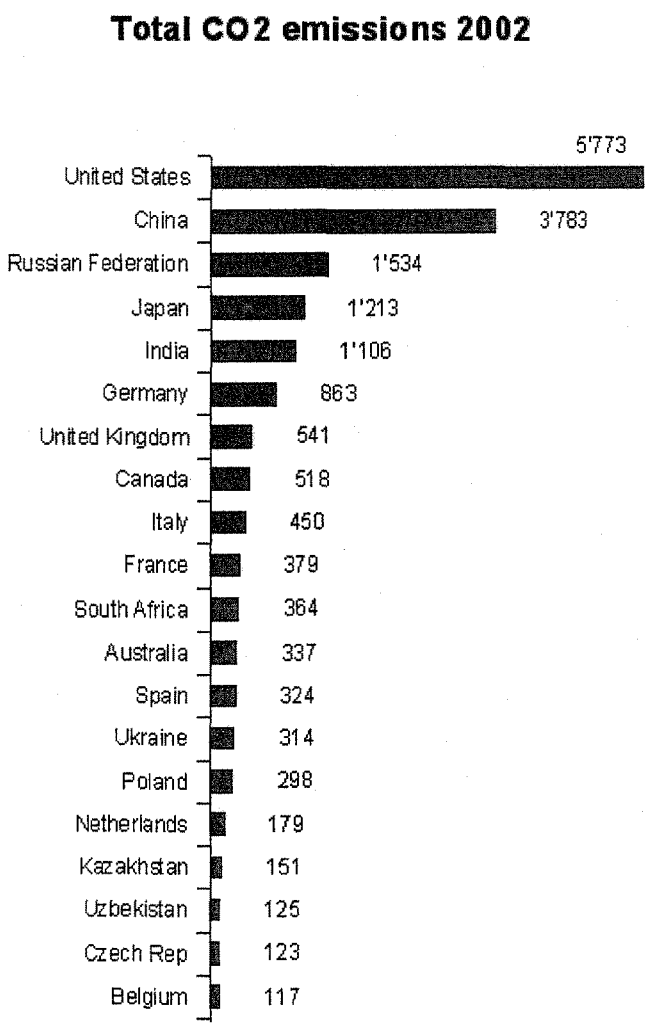
Climate Change

The stationary electricity sector is currently responsible for 50% of Australia's total emissions of greenhouse gases. These emissions have an upward trend both in nominal terms and as a proportion of economy-wide emissions. The sector is by far the most important sector to be targeted in reducing greenhouse gases and because of the relatively small number of facilities involved it is also the sector that is most simple to administer and monitor. The sector also has the alternative technologies capable of immediate deployment to meet demand and overcome capacity constraints.

[1] NEMMCO, Statement of Opportunities, 2005

Recently the Federal Government has revealed a preference for pursuing an Emissions Trading Scheme (ETS) as the initial policy tool in addressing emissions reductions in the economy and therefore climate change. A broad based ETS, although theoretically appealing to economists will not provide sufficient cuts in emissions to meet scientifically proposed limits and although capable of delivering short term low cost of abatement ("low hanging fruit") will not address the sectoral specific nature of the stationary electricity sector. Australia has a competitive advantage over many of its trading partners due to its abundance of fossil fuels and we have electricity prices in the lower half of the OECD[2]. The downside to this is that we have some of the highest per capita emissions in the world. It has been suggested, most notably by the Prime Ministers Task Group on Emissions Trading that Australia's contribution of 1.5% of world-wide emissions is a triviality, Pacific Hydro believes this is an inward looking and curious position in a global economy given that Indonesia also contributes 1.5% of global emissions and has a population of 240 million. Of 200 countries and a total population of Around 7 billion, Australias 21 m people represent only 0.3% of the world's population. Indeed we are batting well above our weight on contributing to emissions and the 1.5% is not insignificant at all when you consider there are 200 countries in the world which implies that the vast majority of countries contribute well under 1% and that the top 20 or so emitters contribute nearly all of the greenhouse gas emissions on the planet. Whilst we agree that a response to climate change needs to be global, Australia is one of the 20 or so Countries that actually do require to take action. The idea that Australia is a minor player simply doesn't stack up. There is no fear of Australia being left out in front in a leadership position given that 168 countries have already ratified Kyoto

Figure 3 Carbon Emissions by Country



[2] Energy Supply Association of Australia, Electricity Australia, 2004.

Subsidies and externalities

It is very difficult to achieve a pure, perfectly competitive energy market. Overall the electricity market is highly regulated with extremely high barriers to entry and significant historical, regulatory and technological lock-in factors. With these factors, Government has an influence in the electricity sector that is significantly higher than in most industries and the regulatory environment closely correlates with the investment environment in the sector.

There are significant market distorting factors in both the fossil fuel and non-fossil fuel sector. Each believes the other ones subsidies are more insidious and more market distorting than the other. We are concerned that the fossil fuel sector is reaping the lion's share of development funding associated with climate change policy reductions emissions. There is a certain irony in this scenario and it is analogous to the Concorde fallacy that drove the British and French Governments to continually provide financial support the Concorde Airplane in unsuccessful attempts to lower its noise pollution and enhance its acceptability in the market place.

The issue of externalities in the industry has been covered extensively and the Stern Review[3] and the Intergovernmental Panel [4] provide comprehensive science on the impacts on greenhouse gases and the climate and the economy. However there still seems to be some misinformation or misunderstanding around the economics of externalities and the economics of market failure.
We know that there are environmental costs borne to society as a result of the activities of fossil fuel generation that are not factored in to the cost of production and consumption but as we cannot yet accurately assign a monetary value to what this damage is (Stern estimates between 5 and 20% of GDP) we cannot build the value into the economic system or internalise the externality. Conceptually the idea of putting a price on carbon attempts to do just this but without knowing the exact extent of the externality (economic damage as a result of climate change) we cannot correctly price carbon and therefore we cannot successfully address the market failure. There is an idea that the market is currently distorted and investment decisions are made in a distorted market because carbon is not costed into the generation process and that a price, any price on carbon will arrest this distortion. The price on carbon under any ETS can only be arbitrary. At least until there is more information available on the likely economic damages directly resultant of emissions from the fossil fuel generation sector. Therefore any arbitrary cost on carbon delivered by an ETS is still a market distortion. It is merely a different market distortion to the one that was in place before. Correcting a market failure can only be done if you know the "true' cost of carbon. Attempting to address market failure by this mechanism alone would merely represent another market distortion by adjusting the market to another arbitrarily regulated technology lock in position that may or may not lead to the deployment that gets the trade off between price and emissions correct. It could just as easily result in position which is worse for consumers and the economy in general.

Using a price signal on carbon as the only intervention in the market failure to address climate change would be a highly uncertain and far from perfect response. The central market failure is only addressed if the carbon price is equal to the true cost of environmental damage it causes. Stern estimates that this may be in the order of $100 a tonne. Given it is politically malfeasant to impose such a charge, then complimentary suites will be required to address the central market failure of greenhouse gas emissions and environmental degradation.

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[3] http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

[4] PCC Fourth Assessment Report, Climate Change 2007: Mitigation of Climate Change

Australia microeconomic modelling by Frontier Economics and Magasanik Mclennan Associates suggests a combination of market based targets for non-fossil fuels combined with a price signal on carbon through an ETS delivers the lowest cost abatement whilst simultaneously providing the desired effect of increasing investment in new generation capacity to address capacity constraints and rising demand.

We believe the best policy path to provide assistance based on liberal economic principles are:

1. Government to set up a clean energy market through a Clean Energy Target :

   in which technologies compete on an equal footing within the market. The role of Government in this case is to set up the basic rules of the market (zero emissions), stand back and let the market compete on an equal footing. The technology mix will therefore be entirely market driven

2. Any direct industry/capital grants to be targeted:

   a) At large scale nation building projects with public good attributes such as transmission lines and grid upgrades;
   b) Research and Development (example LETDF). The R& D budget should me minimal overall given that it is highly likely that most technology will be imported and there is often an economic advantage of early uptakers over early adaptors. I.e. it is not necessary to invent the technology to receive the economic benefits from it.

Technological state of play

In the Australian context, wind energy is easily the most cost effective of the non-fossil fuel generations available. The 2006 Federal Government review on Uranium and Nuclear Energy[5] provided a life cycle analysis of the thermal efficiency of competing energy technologies. Using the pay back methodology wind had a pay-back time of 6 months, nuclear 5 years and solar 7 years. Only hydro electric generation in high rainfall areas not available in Australia had a shorter payback period to wind.

The cost of energy from larger electrical output wind turbines dropped from more than $1 per kWh in 1978 to around 5c per kWh in 1998. The cost in Australia is currently around the 7c per kWh although supply bottlenecks for turbine manufacturers have created a temporary spike in turbine prices. This is expected to ease substantially with new production facilities coming into production in China and India in 2008. As the hardware prices of wind turbines falls beneath $1000 an installed kilowatt, they will underprice the capital costs of almost every type of power plant. [6]

There is much misleading information about the ability of wind to provide "baseload power" due to the intermittent nature of localised wind resources. For instance a wind farm operates at capacity factors of between 0.30 and 0.40 compared to fossil fuel generators with factors around the 0.60 mark. However unlike fossil fuel generation, the wind resource of a particular site is constant for the life of the machine and is not subject to variable cost increases. Once this is known, it is easy for planners to attribute to output from a particular wind farm into the supply required for the grid. This is in contrast to the fossil fuel industry which has a perverse interest to speed up the depletion of the resource to increase prices in the short to medium term. Figure 4 Shows wind compared with its closest rival, natural Gas.

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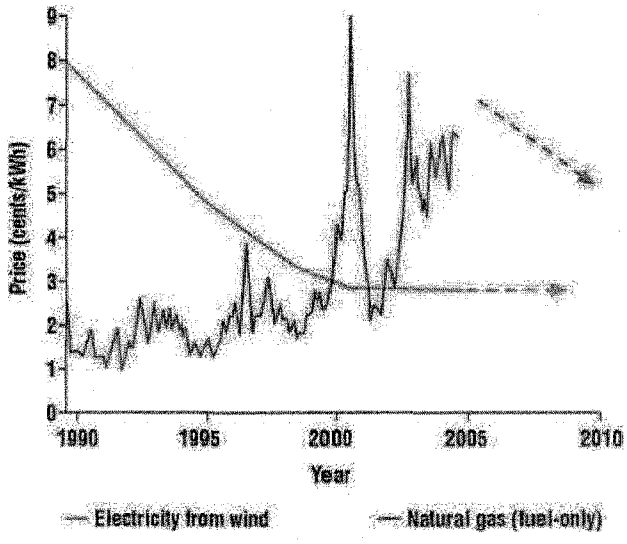
[5] http://www.pmc.gov.au/umpner/

[6] Mining Chronicle, Clean power from a never-ending source, June 2007.

Figure 4 Wind costs compared with Natural Gas



Transmission

Pacific Hydro believes that urgent reform is required in the transmission and distribution segments of the electricity reform. The exact nature of that reform is still open and the Energy Supply Association of Australia has made an important start to the debate with the release of a report[7] on this subject.

We believe that in many cases transmission is a public good and conventional monopoly regulation in this important area is not appropriate. Transmission lines are similar in their economic nature to some road, port, rail and communications infrastructures where a natural monopoly exists but conventional monopoly regulation has resulted in large scale under-investment in infrastructure.

The existing Transmissions network means that the excellent wind resource in South Western Australia remains isolated from the NEM network as do the geothermal resources in Northern South Australia. Currently there is no mechanism available to develop new transmission in remote areas. The costs are prohibitive for the private sector under the conventional monopoly rate of return regulation that persists in Australia and the Government has been reluctant to build infrastructure where it believes it may crowd out more efficient private investment. This stand-off has resulted in continual under-investment in grid maintenance, upgrades and expansion. The Appendix to this submission gives the Standing Committee an alternative viewpoint into how transmission investment is handled in other parts of the world, in this case, the largest US State of Texas where an excellent wind resource is located in remote areas no connected by existing grid infrastructure and just happened to have the highest level of wind installation in the world in 2006 which affirms our contention that the regulatory environment closely correlates with the investment environment in the sector.

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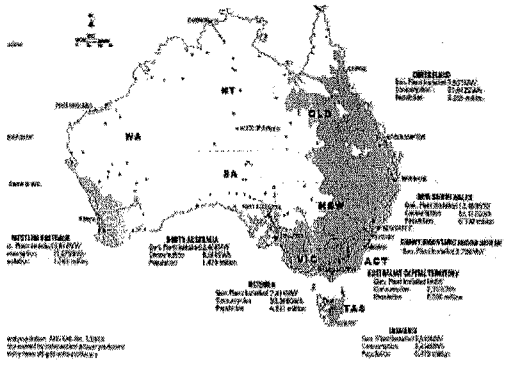
7 http://www.esaa.com.au/images/stories//3cs%20cra%20report_effects%20of%20retail%20price%20regulation%20in%20energy%20markets.pdf

Figure 5 NEM grid



The Australian market favours large wind farms with high voltages[8] and as can be seen if you compare Figure 5 with Figures 2 and 3 the existing Transmission system favours sources of generation in proximity to the coast. According to a study by the Australia Greenhouse Office, "*the NEM could readily accept 8000MW of wind farms under certain conditions*"[9]. Given the current installation of wind in the NEM is around 1000MW, it is safe to say that the NEM could easily cope with a rapid expansion of the industry in the short term without any major upgrades to the grid infrastructure.

Summary

In summary Pacific Hydro holds a very sanguine view on the short-term potential of the non-fossil fuel sector in Australia. Recent data on costs and learning curves suggest that the technologies within the sector are rapidly moving towards cost competitiveness with the fossil factor but without the associated environmental costs. Australian microeconomic modelling shows that early deployment of these technologies will lower the overall costs to the economy in terms of long-term electricity prices, increase the level of energy security and reduce risks to environment the environment as part of a global effort.

Benefits deliverable by the non-fossil fuel sector are:

- Energy Security and increased investment in electricity generation;
- Low average cost of abatement;
- Immediate and sustained reduction in emissions from the stationary electricity sector;
- Nation building and capacity building through enhanced energy infrastructure;
- *Technological development through learning by doing and driving costs curves down; and*
- Regional development and jobs.

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8 http://www.ceem.unsw.edu.au/content/userDocs/200608WREC9_WindIntegrationNEM_PPT_000.pdf

9 National Wind Power Study, Australian greenhouse Office, November 2003.